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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/045,377	11/09/2001	Mitsuru Uda	JP920000352US1	2351
32074	7590	12/14/2004	EXAMINER BARTH, VINCENT P	
INTERNATIONAL BUSINESS MACHINES CORPORATION DEPT. 18G BLDG. 300-482 2070 ROUTE 52 HOPEWELL JUNCTION, NY 12533			ART UNIT 2877	PAPER NUMBER

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Office Action Summary</b></p>	<b>Application No.</b> 10/045,377	<b>Applicant(s)</b> UDA ET AL.	
	<b>Examiner</b> Vincent P. Barth	<b>Art Unit</b> 2877	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 November 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>0904, 0803</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first and second paragraphs of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Referring to Claim 18, the limitation in which the light source is at substantially the same height of the resist pattern renders the claim indefinite. It would seem that a light source at the same height at the resist pattern would not create an angle theta (as shown in instant Fig. 3b) as required in the steps set forth in Claim 11. Thus, with such construction, light would not diffract from the resist pattern. In the alternative, and using the construction set forth above, the claim language would not enable one to construct a device creating diffraction. Accordingly, the Examiner respectfully requests that Applicants either provide an appropriate explanation of the claim limitation, preferably citing to portions of the Specification and/or Drawings, or provide an appropriate amendment to the claim. However, the claim has been discussed below as it may best be understood.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 5-11 and 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uda, et al., U.S. Pat. No. 6,825,924 (30 Nov. 2004), in view of Gitin, U.S. Pat. No. 5,406,060 (11 Apr. 1995).

6. Referring to Claim 1, Uda discloses a system for illuminating and inspecting finely formed periodic structures on a wafer, such as those formed from a resist pattern, which function as diffraction gratings (col. 4, lns. 22-24). Uda discloses that such diffraction effects from the illumination impinging on the surface may be viewed visually (col. 4, ln. 42). Uda discloses that the illuminator 12 (Fig. 1) impinges on the surface of the substrate at a “shallow” angle, which in one exemplary embodiment is 15 degrees from the surface plane (col. 6, lns. 36-42). The ordinary construction of the term “shallow” in the art, in the context of illumination, is that the illumination is incident at an angle of 45 degrees or less. For example, Gitin involves context of an optical bar code reader in which the illumination source is inclined at a “shallow (acute)” angle, which is explicitly defined in the reference as 45 degrees or less (col. 4, lns. 29-32). Uda and Gitin are analogous art, since they are from a similar problem solving area, in that each involves illumination of a surface at a shallow angle for inspection. See Medtronic, Inc. v. Cardiac Pacemakers, 721 F.2d 1563, 1572-1573, 220 USPQ 97, 103-104 (Fed. Cir., 1983). The

Art Unit: 2877

motivation for combining the reference would have been to provide an illustration of the ordinary construction of the term shallow angle in the context of illuminating a surface for inspection. Accordingly, it would have been obvious to those skilled in the art to combine the references, at the time of the invention, in order to obtain such benefit. Moreover, Uda discloses that the angle of incidence for the illuminator 12 is related to the pitch of the diffracting patterns on the wafer surface (col. 6, lns. 40-42), rather than limiting the invention to any particular angle threshold. Therefore, in the alternative to construing the term “shallow” in the Uda reference to mean 45 degrees or less, those of ordinary skill in the art practicing the Uda invention would experiment with the angle of inclination of the illuminator 12 based on the pitch of the diffraction pattern on the wafer. “[I]t is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). See MPEP §2144.05(II). Accordingly, the angle of inclination of the illumination source in the instant invention would have been obvious to those of ordinary skill in the art.

7. Referring to Claims 5 and 19, Uda discloses that the substrate 18 may be rotated 90 degrees (col. 7, ln. 30). Thus, if the diffraction grating lines were not perpendicular to the incident light initially, such lines would be perpendicular following a rotation of 90 degrees.

8. Referring to Claims 6-9 and 15-17, Uda discloses that in one embodiment, the light source may have a plurality of “complimentary” visible wavelength outputs (col. 8, lns. 16-41). The term “complimentary color pair” (col. 8, ln. 27) is construed herein to correspond to the limitation “different colors” in Claim 9, and “different wavelengths” in Claim 17. Uda appears to suggest that the color pairs may be any pair in the visible range which is chosen by the user to be easily visualized. Some exemplary wavelengths provided in the Uda reference are 486 nm

Art Unit: 2877

and 656 nm (col. 8, lns. 31-32), however, as per the suggestion in the reference, those of skill in the art would be able to choose any pairs in the visible range (i.e., approximately 400 nm to 700 nm) which are easily visualized. MPEP §2144.05 states that, "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists, citing In re Wertheim, 541 F.2d 257, 191USPQ 90 (CCPA 1976) and In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed.Cir. 1990). Accordingly, the modification claimed over the prior art would have been obvious to those skilled in the art at the time of the invention.

9. Referring to Claim 10, Uda discloses that the light source for the fiber may be fluorescent tube or LED's, without limitation (col. 8, lns. 16-42). Thus, a halogen lamp would represent an obvious design choice among the numerous possible lighting sources available in the market. Applicant has not disclosed that halogen lamp provides an advantage, is used for a particular purpose, solves a stated problem, or functions differently from the prior art in the Uda reference. Thus, the invention would perform equally well with either a halogen lamp or the light sources disclosed in the Uda reference. Accordingly, it would have been obvious design choice to those skilled in the art at the time of the invention to modify Uda to obtain the invention as claimed. In the alternative, the selection of a halogen lamp represents a non-critical limitation. The Specifications in the instant Application do not disclose why a halogen lamp is a critical limitation over the prior art lighting sources in the Uda reference. See MPEP §2144.05(III) and §§716.02-716.02(g) for a discussion of criticality and unexpected results.

10. Referring to Claims 11 and 18, Uda discloses a system for illuminating and inspecting finely formed periodic structures on a wafer, such as those formed from a resist pattern, which function as diffraction gratings (col. 4, lns. 22-24). Uda discloses that such diffraction effects

Art Unit: 2877

from the illumination impinging on the surface may be viewed visually (col. 4, ln. 42). Uda discloses that the illuminator 12 (Fig. 1) impinges on the surface of the substrate at a “shallow” angle, which in one exemplary embodiment is 15 degrees from the surface plane (col. 6, lns. 36-42). The ordinary construction of the term “shallow” in the art, in the context of illumination, is that the illumination is incident at an angle of 45 degrees or less. For example, Gitin involves context of an optical bar code reader in which the illumination source is inclined at a “shallow (acute)” angle, which is explicitly defined in the reference as 45 degrees or less (col. 4, lns. 29-32). Uda and Gitin are analogous art, since they are from a similar problem solving area, in that each involves illumination of a surface at a shallow angle for inspection. See Medtronic, Inc. v. Cardiac Pacemakers, 721 F.2d 1563, 1572-1573, 220 USPQ 97, 103-104 (Fed. Cir., 1983). The motivation for combining the reference would have been to provide an illustration of the ordinary construction of the term shallow angle in the context of illuminating a surface for inspection. Accordingly, it would have been obvious to those skilled in the art to combine the references, at the time of the invention, in order to obtain such benefit. Moreover, Uda discloses that the angle of incidence for the illuminator 12 is related to the pitch of the diffracting patterns on the wafer surface (col. 6, lns. 40-42), rather than limiting the invention to any particular angle threshold. Therefore, in the alternative to construing the term “shallow” in the Uda reference to mean 45 degrees or less, those of ordinary skill in the art practicing the Uda invention would experiment with the angle of inclination of the illuminator 12 based on the pitch of the diffraction pattern on the wafer. “[I]t is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). See MPEP §2144.05(II). Accordingly, the angle of inclination of the illumination source

Art Unit: 2877

in the instant invention would have been obvious to those of ordinary skill in the art. Uda does not explicitly disclose that the light diffracted back to the side of the light source may be viewed. However, Uda explicitly suggests that, "it is preferable to preselect by experiments, or the like, the angle at which the human eyes can look at the diffracted light" (col. 6, lns. 65-67).

Therefore, those practicing the invention would be expected to experiment with a variety of viewing angles, including the observation point at which the light is diffracted back to the side of the light source.

11. Claims 2-4 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uda, et al., U.S. Pat. No. 6,825,924 (30 Nov. 2004), in view of Gitin, U.S. Pat. No. 5,406,060 (11 Apr. 1995), further in view of Kobayashi, et al., U.S. Pat. No. 4,317,633 (2 Mar. 1982).

12. Referring to Claims 2, 3, 12 and 13, Uda discloses that the illuminator 12 may be in the form of a fiber optic light conductor 40 (col. 8, lns. 8-15; and Fig. 4), without commenting on the light output divergence from a typical fiber. As an example of such divergence, Kobayashi explicitly discloses that the angle of divergence from a typical fiber is about 70 to 80 degrees (col. 3, lns. 18-20). Uda, Gitin and Kobayashi are analogous art, since they are from a similar problem solving area, in that each involves illumination sources. See Medtronic, Inc. v. Cardiac Pacemakers, 721 F.2d 1563, 1572-1573, 220 USPQ 97, 103-104 (Fed. Cir., 1983). The motivation for combining the references would have been to provide an explicit example of the divergence angle from a typical optical fiber. Accordingly, it would have been obvious to those skilled in the art to combine the references, at the time of the invention, in order to obtain such benefit. In the alternative, the instant Specification acknowledges that the angle of divergence



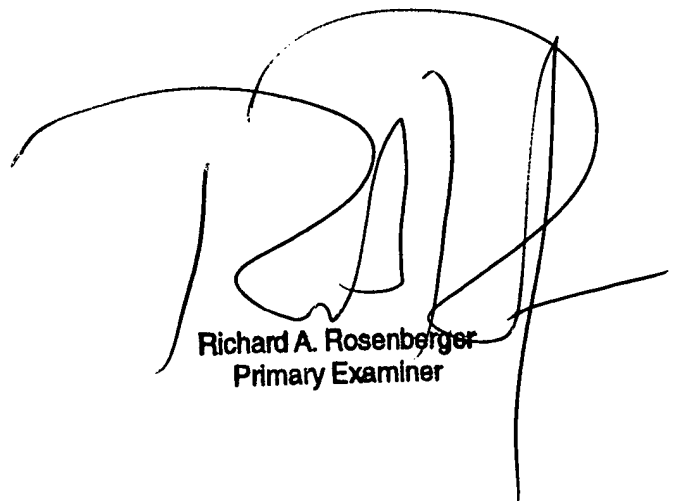
Art Unit: 2877

from such fiber would be in the range of 10 to 70 degrees. Thus, the angle of divergence from an exemplary fiber light source is admitted to have such range. MPEP §2129 states, "When applicant states that something is prior art, it is taken as being available as prior art against the claims.", citing In re Nomiya, 509 F.2d 566, 184 USPQ 607 (1975). Moreover, MPEP §2144.05 states that, "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists, citing In re Wertheim, 541 F.2d 257, 191USPQ 90 (CCPA 1976) and In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed.Cir. 1990). Accordingly, the modification claimed over the prior art would have been obvious to those skilled in the art at the time of the invention.

13. Referring to Claims 4 and 14, Uda discloses that the illuminator 12 may be in the form of a fiber optic light conductor 40 (col. 8, lns. 8-15; and Fig. 4). If those practicing the Uda invention sought to narrow the divergence angle from the fiber, a common solution would be to dispose a lens at the end of such fiber. See MPEP §2144.03.

**CONCLUSION**

14. Applicants' Claims 1-19 are rejected based on the reasons set forth above.
15. Any inquiries concerning this communication from the Examiner should be directed to Vincent P. Barth, whose telephone number is 571-272-2410, and who may be ordinarily reached from 9:00 a.m. to 5:30 p.m., Monday through Friday. The fax number for the group before final actions is 703-872-9306.
16. If attempts to reach the Examiner prove unsuccessful, the Examiner's supervisor is Gregory J. Toatley, Jr., who may be reached at 571-272-2800, ext. 77.
17. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Richard A. Rosenberger  
Primary Examiner